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Performance Oriented Packaging (POP) Test of Wirebound Box, Part number 7553347 for Small Caliber Ammunition Packed in M2A1 Metal Container

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This report covers the POP testing of wirebound box, part number 7553347, used as shipping container for small caliber ammunition. The exterior wirebound box contains two M2A1 metal inner containers (Dwg 7553296) containing various small arms ammunition, items of differing quantities and weights. Tests were conducted using containers containing additional weights to insure that tested weight is higher than heaviest pack to insure safety in shipping.

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PERFORMANCE ORIENTED PACKAGING TESTING

OF

WIREBOUND BOX FOR SMALL CALIBER AMMUNITION PACKED IN M2A1 METAL CONTAINER

FOR

PACKING GROUP II
SOLID HAZARDOUS MATERIALS

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INTRODUCTION

The Department of Transportation (DOT) per CFR 49, Parts 100-179, dated 1 Oct 91, requires that hazardous materials should be packed in a container that passes the Performance Oriented Packaging (POP) tests.

Wirebound box, part no. 7553347, is being used as shipping container for small caliber ammunition. This box contains two (2) M2A1 metal containers containing various small arms ammunition items of different quantities and weights.

POP tests were conducted using containers containing additional weights to insure that the tested weight is higher than the heaviest pack to insure container integrity. The tests were conducted in accordance with the referenced sections of CFR 49 and are valid only when approved ammunition is packed in the M2A1 container for the DOD.

TESTS PERFORMED

1. Drop Test

Section 178.603 of CFR 49 specifies that one box each should be used for each drop orientation. Five (5) boxes were used for five different orientations.

One box each was dropped from a height of 1.2 meters (3.9 ft) in the following orientations: flat on bottom, flat on top, flat on long-side, flat on short-side, and on a corner.

2. Vibration Test

Three (3) boxes were placed on the vibrating platform and vibrated for a duration of one hour. The boxes were unrestrained except horizontally to prevent them from falling off of the platform. The peak-to-peak displacement was one inch and the frequency was 300 rpm. This frequency was sufficient enough to allow the package to become completely airborne, enabling a 1/16 inch (.16 cm) thick piece of strapping material to be slid underneath the package during testing.

3. Stacking Test

Section 178.606 of CFR 49 requires that the minimum height of the stack including the test sample must be 3.0 meters (10 ft). Three test samples are required.

A 3.0 meter stack height of samples is equivalent to 2120 lbs. (964 kg) of stack weight. Three different test samples were each subjected to a stack weight of 2120 lbs for a period of 24 hours. The samples were then inspected and examined for any damage or distortion.

PASS/FAIL (DOT CRITERIA)

A package for explosives is considered to successfully pass the drop tests if for each sample tested, no rupture of the packaging occurs.

A packaging passes the vibration test if there is no rupture or leakage from any of the packages.

A test sample passes the stacking test when no test sample leaks. No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength or cause instability in stacks of packages.

TEST RESULTS

1. Drop Test - Result: Pass - no spillage.

The first four drops did not do any damage on any of the four boxes. On the corner drop, one of the long-side of the box cracked, but there was no spillage.

2. Vibration Test - Result: Pass - no spillage or damage.

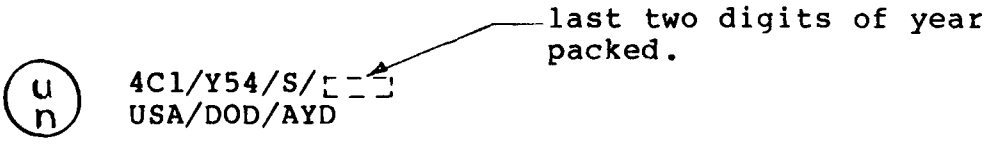
All three boxes were removed from the platform after one hour vibration. Each of the boxes was turned on its side and inspected for any damage and leakage. The packages were all tightly intact and showed no evidence of deterioration.

3. Stacking Test - Result: Pass - no evidence of distortion.

The stacking test was performed with the use of a forklift to apply a dead load of 2120 pounds on top of each of the three packages. Each of the packages adequately supported the applied load. No evidence of package distortion was noted.

REMARK

Based on the successful POP testing outlined in this report, the following POP symbol:



shall be applied to containers manufactured in accordance with drawing 7553347 when used to package the NSN's listed in Tables I to VI.

REFERENCE MATERIAL

1. Federal Register, "49 CFR Part 107, 1 Oct 91"
2. Federal Specification PPP-B-585

TEST DATA

DATA:

Container (Outer):

Type: Box, wirebound
Part No.: 7553347
UN Code: 4C1
Spec No.: PPP-B-585
Material: Wood
Capacity: 19.1 liters
Dimensions:

Inside: 31.52 cm x 30.96 cm x 19.53 cm
(12 3/16 in x 12 1/16 in x 7 9/16 + 1/8 in)

Outside: 36.67 cm x 31.83 cm x 20.64 cm
(14 7/16 in x 12 17/32 in x 8 1/8 in)

Weight: 2.5 kg (5.5 lbs)

Container (Inner):

Type: Box
Model No.: M2A1
Spec No.: MIL-B-3060
Material: Metal
Capacity: 6.8 liters
Dimensions:

Inside: 27.94 cm x 14.13 cm x 17.22 cm
(11 in x 5 9/16 in x 6 25/32)

Outside: 30.56 cm x 15.48 cm x 19.05 cm
(12 1/32 in x 6 3/32 in x 7 1/2 in)

Weight: 2.5 kg (5.5 lbs)
Closure (Method/Type): Hinged Lid

TEST DATA

PRODUCT(S):

Identification No.: See Tables I - VI
UN Packing Group: II
Physical State: Solid
Amount per Container: See Tables I - VI

TEST MATERIALS:

Name: Simulated Weights and Sand
Physical State: Solid
Size: 10 in (L) x 3 in (W) x 3 in (H)
or 2 in dia x 7/8 in thick
or granulated sand
Quantity: Twelve (12) lead weights
or lead tablets
or 140 lbs
Dunnage: Polyethylene foam per PPP-C-1752
Gross Weight: 154 lbs (70 kg)

TABLE I

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
A080	1305-00-182-3217	5.56mm	Blank	1.4S	0014	2280	25
A068	1305-00-914-4719	5.56mm	Tracer	1.4S	0012	1640	29
A072	1305-00-926-3929	5.56mm	Tracer	1.4S	0012	1680	31
A071	1305-00-926-3930	5.56mm	Ball	1.4S	0012	1680	31
A066	1305-00-926-3970	5.56mm	Ball	1.4S	0012	1640	29
A073	1305-00-935-9253	5.56mm	Ball / Tracer	1.4S	0012	1800	33
A068	1305-00-965-0832	5.56mm	Tracer	1.4S	0012	1440	23
A058	1305-01-155-5455	5.56mm	Ball	1.4S	0012	1640	30
None	1305-01-155-5456	5.56mm	Ref.	1.4S	0012	1640	30
A063	1305-01-155-5457	5.56mm	Tracer	1.4S	0012	1640	30
A058	1305-01-155-5458	5.56mm	Ball	1.4S	0012	1680	29
A059	1305-01-155-5459	5.56mm	Ball	1.4S	0012	1680	31
A062	1305-01-155-5461	5.56mm	Ball	1.4S	0012	1600	32
A059	1305-01-155-5462	5.56mm	Ball	1.4S	0012	1680	31
A075	1305-01-155-5463	5.56mm	Blank	1.4S	0014	1600	21
A075	1305-01-155-5464	5.56mm	Blank	1.4S	0014	800	17
A064	1305-01-156-7584	5.56mm	Ball / Tracer	1.4S	0012	800	21
A062	1305-01-174-9277	5.56mm	Ball	1.4S	0012	800	21
A075	1305-01-174-9278	5.56mm	Blank	1.4S	0014	800	17
A071	1305-01-255-6276	5.56mm	Ball	1.4S	0012	1680	31
A072	1305-01-258-8693	5.56mm	Tracer	1.4C	0339	1680	31
None	1305-01-M30-1874	5.56mm	Ref.	None	None	1640	29
G841	1330-00-764-8435	5.56mm	Grenade	1.4S	0014	2280	28

TABLE II

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
A136	1305-00-064-2896	7.62mm	Spl Ball	1.4S	0012	920	33
A131	1305-00-143-7163	7.62mm	Ball / Tracer	1.4S	0012	600	27
A102	1305-00-182-3096	7.62mm	Ball	1.4S	0012	1320	34
A103	1305-00-182-3126	7.62mm	Blank	1.4S	0014	1320	25
A143	1305-00-257-1089	7.62mm	Ball	1.4S	0012	600	27
A135	1305-00-542-1272	7.62mm	Dummy	None	None	920	25
A130	1305-00-555-4275	7.62mm	Ball	1.4S	0012	840	33
A129	1305-00-580-0131	7.62mm	HPT	1.4S	0012	920	34
A122	1305-00-914-4676	7.62mm	Ball	1.4S	0012	920	33
A140	1305-00-926-4017	7.62mm	Tracer	1.4S	0012	920	33
A166	1305-00-935-9289	7.62mm	Overhead Fire	1.4S	0012	920	33
A167	1305-00-935-9290	7.62mm	O.F. Tracer	1.4S	0012	920	33
A162	1305-00-943-0448	7.62mm	Dummy	None	None	920	33
A149	1305-00-965-0601	7.62mm	Ball	1.4S	0012	864	36
A112	1305-00-990-5594	7.62mm	Blank	1.4S	0014	1200	27
A171	1305-01-120-0970	7.62mm	Match	1.4S	0012	920	33
G839	1330-01-077-4291	7.62mm	Grenade	1.4S	0012	1320	29

TABLE III

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
B475	1310-00-133-9413	40mm	Smoke Signals	1.4G	0197	44	21
B535	1310-00-159-3198	40mm	Signal Flare	1.4G	0312	44	21
B477	1310-00-179-1163	40mm	Smoke Signals	1.4G	0197	44	21
B479	1310-00-179-1170	40mm	Smoke Signals	1.4G	0197	44	21
B504	1310-00-541-6148	40mm	Signal Flare	1.4G	0312	44	21
B505	1310-00-541-6149	40mm	Signal Flare	1.4G	0312	44	21
B506	1310-00-541-6150	40mm	Smoke Signals	1.4G	0197	44	21
B508	1310-00-541-6152	40mm	Smoke Signals	1.4G	0197	44	21
B509	1310-00-541-6153	40mm	Smoke Signals	1.4G	0197	44	21
B536	1310-00-922-9784	40mm	Signal Flare	1.4G	0312	44	21
B519	1310-01-107-5404	40mm	Practice	1.4C	0339	44	21
B472	1310-01-128-0403	40mm	Dummy	N/A	N/A	44	21

TABLE IV

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
A186	1305-00-028-6148	Cal .30	Dummy	None	None	2000	
A201	1305-00-028-6162	Cal .30	AP	1.4S	0012	960	
A202	1305-00-028-6185	Cal .30	AP	1.4S	0012	800	
A201	1305-00-028-6187	Cal .30	AP	1.4S	0012	880	
A216	1305-00-028-6215	Cal .30	CLPD	1.4S	0012	768	
A222	1305-00-047-3871	Cal .30	BLNK	1.4S	0014	1240	
A182	1305-00-301-1661	Cal .30	CLPD	1.4S	0012	1680	
A182	1305-00-301-1662	Cal .30	CLPD	1.4S	0012	2160	
A224	1305-00-301-1670	Cal .30	BLNK	1.4S	0014	960	
A201	1305-00-542-1119	Cal .30	AP	1.4S	0012	800	

TABLE V

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
A404	1305-00-123-0548	Cal .38	Spl Match	1.4S	0012	2400	43
A475	1305-00-301-1685	Cal .45	Ball	1.4S	0012	2000	29
A480	1305-00-301-1686	Cal .45	HPT	1.4S	0012	2000	53
A400	1305-00-322-6391	Cal .38	Spl Ball	1.4S	0012	2400	43
A501	1305-00-516-5234	Cal .45	Dummy	None	None	2000	47
A397	1305-00-553-4779	Cal .38	Spl Ball	1.4S	0012	2400	43
A482	1305-00-752-7910	Cal .45	Match	1.4S	0012	2000	49
A476	1305-00-753-2304	Cal .45	Blank	1.4S	0014	2000	18
A483	1305-00-892-2526	Cal .45	Match	1.4S	0012	2000	49
A479	1305-00-905-6788	Cal .45	Tracer	1.4S	0012	2000	49
A363	1305-01-172-9558	9mm	Ball	1.4S	0012	2000	36
A364	1305-01-173-2397	9mm	HPT	1.4S	0012	2000	36
A359	1305-01-206-8351	9mm	Dummy	None	None	2000	
A011	1305-01-232-8338	12 GA	Shot Shell	1.4S	0012	320	24

TABLE VI

DODIC OR NALC	NSN	HM ITEM	TYPE	HAZARD CLASS	UN NO.	#/CNTR	WT KG
A553	1305-00-028-6336	Cal .50	Ball	1.4C	0339	240	36
A560	1305-00-028-6381	Cal .50	Dummy	None	None	240	30
A560	1305-00-028-6384	Cal .50	Dummy	None	None	240	27
A555	1305-00-028-6574	Cal .50	Ball	1.4C	0339	200	35
A557	1305-00-028-6583	Cal .50	Ball / Tracer	1.4C	0339	200	35
A543	1305-00-028-6601	Cal .50	APIT	1.4G	0300	200	35
A576	1305-00-028-6603	Cal .50	API / APIT	1.4G	0300	200	35
A527	1305-00-096-3141	Cal .50	AP	1.4C	0339	200	35
A574	1305-00-164-5343	Cal .50	Spotter Tracer	1.4C	0339	220	35
A562	1305-00-301-1643	Cal .50	Incendiary	1.4G	0300	240	36
A564	1305-00-305-0894	Cal .50	Incendiary	1.4G	0300	200	35
A571	1305-00-585-5188	Cal .50	Tracer	1.4C	0339	240	36
A546	1305-00-585-5368	Cal .50	Ball	1.4C	0339	200	35
A589	1305-00-689-4709	Cal .50	API / APIT	1.4G	0300	170	31
A520	1305-00-764-8386	Cal .50	Ball / Tracer	1.4C	0339	170	31
A540	1305-00-935-2017	Cal .50	API / Tracer	1.4G	0300	200	35
A605	1305-00-935-2109	Cal .50	Ball	1.4C	0339	170	31
A574	1305-00-935-6067	Cal .50	Spotter Tracer	1.4C	0339	220	35
A579	1305-00-965-0553	Cal .50	Practice	1.4C	0339	220	35
A598	1305-01-078-4879	Cal .50	Blank	1.4C	0338	200	
A599	1305-01-085-5118	Cal .50	Blank	1.4C	0338	170	
A603	1305-01-126-6200	Cal .50	Sr Tng Ball	1.4S	0012	200	15
A602	1305-01-126-6201	Cal .50	Sr Tng Ball / Sr Tng Tracer	1.4S	0012	200	15
A595	1305-01-127-7870	Cal .50	Sr Tng Tracer	1.4S	0012	200	15